

ABSTRACT OF THE DISCLOSURE

A TPSRM may include a stator, having a plurality of poles and a ferromagnetic or iron back material, and a rotor having a plurality of poles and a ferromagnetic or iron back material. A current flowing through coils wound around a first set of the plurality of stator poles induces a flux flow through the first set of stator poles and portions of the stator back material during a first excitation phase. A current flowing through coils wound around a second set of the plurality of stator poles induces a flux flow through the second set of stator poles and portions of the stator back material during a second excitation phase. The numbers of stator and rotor poles for this TPSRM are selected such that substantially no flux reversal occurs in any part of the stator back material as a result of transitioning between the first and second excitation phases.